What is claimed is:

1. A deceleration lens for an ion implanter, comprising:

an electrode body which defines an aperture having a periphery, a center, an axis passing through said center and defining a length of said aperture along said axis, said axis comprising a first axis segment extending from the center of said aperture toward the periphery of said aperture along said axis and having a length in the range of 20-40% of said aperture length, wherein the average width of the aperture measured at points along said axis segment is less than the width of said aperture measured at the center of said aperture.

2. The lens of claim 1 wherein the average width of the aperture measured at points along said axis segment is within a range of 50 - 98% of the width of said aperture measured at the center of said aperture.

3. The lens of claim 1 wherein the width of the aperture as measured at points along said axis segment decreases monotonically from the center of said aperture to the end of said axis segment.

4. The lens of claim 1 wherein said aperture is elongated.

5. The lens of claim 1 wherein said aperture is noncircular.

6. The lens of claim 4 wherein said aperture is elliptical and said lens is one of a prefocusing lens and a focusing lens.

7. The lens of claim 1 wherein the aperture has a maximum width and a maximum length and the ratio of the aperture maximum width to the aperture maximum length is within a range of 0.2 - 1.

8. The lens of claim 1 wherein said aperture has four sides and four corners wherein each corner joins two adjacent sides and wherein each corner is rounded in shape.

9. The lens of claim 8 wherein the four sides are each of equal length.

10. A method of forming an ion beam for implanting material into a semiconductor, comprising:

passing an ion beam through an aperture of a deceleration lens electrode body wherein the aperture has a periphery, a center, an axis passing through said center and defining a length of said aperture along said axis, said axis comprising a first axis segment extending from the center of said aperture toward the periphery of said aperture along said axis and having a length in the range of 20-40% of said aperture length, wherein the average width of the aperture measured at points along said axis segment is less than the width of said aperture measured at the center of said aperture; and

applying a potential to said body to produce an electric field adjacent said aperture to change the velocity of at least some ions of the ion beam, wherein said electric field has properties which are a function of the shape of the aperture.

11. The method of claim 10 wherein the average width of the aperture measured at points along said axis segment is within a range of 50 - 98% of the width of said aperture measured at the center of said aperture.

12. The method of claim 10 wherein the width of the aperture as measured at points along said axis segment decreases monotonically from the center of said aperture to the end of said axis segment.

13. The method of claim 10 wherein said aperture is elongated.

14. The method of claim 10 wherein said aperture is noncircular.

15. The method of claim 13 wherein said aperture is elliptical.

16. The method of claim 10 wherein the aperture has a maximum width and a maximum length and the ratio of the aperture maximum width to the aperture maximum length is within a range of 0.2 - 1.

17. The method of claim 10 wherein said aperture has four sides and four corners wherein each corner joins two adjacent sides and wherein each corner is rounded in shape.

18. The method of claim 17 wherein the four sides are each of equal length.

19. An ion implanter for implanting material in a semiconductor, comprising:

a holder adapted to hold the semiconductor;

an ion beam generator adapted to generate a beam of ions; and

a deceleration lens assembly adapted to control the energy of the ion beam before implantation into the semiconductor, the assembly including an electrode having a body which defines an aperture having a periphery, a center, an axis passing through said center and defining a length of said aperture along said axis, said axis comprising a first axis segment extending from the center of said aperture toward the periphery of said aperture along said axis and having a length in the range of 20-40% of said aperture length, wherein the average width of the aperture measured at points along said axis segment is less than the width of said aperture measured at the center of said aperture.

20. The ion implanter of claim 19 wherein the aperture is elongated, the average width of the aperture measured at points along said axis segment is within a range of 50 - 98% of the width of said aperture measured at the center of said aperture and wherein the width of the aperture as measured at points along said axis segment decreases monotonically from the center of said aperture to the end of said axis segment.

21. The ion implanter of claim 20 wherein said aperture is elliptical.

22. The ion implanter of claim 20 wherein said aperture is noncircular.

23. The ion implanter of claim 19 wherein the aperture has a maximum width and a maximum length and the ratio of the aperture maximum width to the aperture maximum length is within a range of 0.2 - 1.

24. The ion implanter of claim 19 further comprising a magnet positioned adjacent the ion beam generator and adapted to spatially resolve the beam ions according to their mass; and

an ion selector disposed adjacent the analyzing magnet and adapted to select a specie of ions and to reject other ions in the spatially resolved beam from the magnet.

25. A deceleration lens for an ion implanter, comprising:

an electrode body which defines an elliptical aperture having a periphery, a center, an axis passing through said center and defining a length of said aperture along said axis, said axis comprising a first axis segment extending from the center of said aperture toward the periphery of said aperture along said axis and having a length in the range of 20-40% of said aperture length, wherein the average width of the aperture measured at points along said axis segment is within a range of 50 - 98% of the width of said aperture measured at the center of said aperture, wherein the width of the aperture as measured at points along said axis segment decreases monotonically from the center of said aperture to the end of said axis segment, and wherein the aperture has a maximum width and a maximum length and the ratio of the aperture maximum width to the aperture maximum length is within a range of 0.2 - 1.